

Metadata Description

I. IDENTIFICATION TAB

A. CITATION PAGE

FIELD	FIELD CONTENT
* CATEGORY	Air quality
* PUBLICATION DATE	February 9, 2010
* TITLE	Space-time Predictions of Air and Deposition Pollutants
URL	
* NATIVE DATASET ENVIRONMENT	Predictive output files (.csv) include the following variables: Date, Longitude, Latitude, CMAQ column, CMAQ row, Predictions, Predictive standard error

B. DESCRIPTION PAGE

FIELD	FIELD CONTENT
* ABSTRACT	<p>A space-time Bayesian fusion model (McMillan, N., Holland, D. M., Morara, M., and Feng, J. (2010). Environmetrics 21, 48-65; http://www3.interscience.wiley.com/cgi-bin/fulltext/122546906/PDFSTART) is used to provide daily, gridded predictive PM_{2.5} (daily average) and O₃ (daily 8-hr maximum) surfaces for 2001-2006. The fusion model uses both air quality monitoring data from the National Air Monitoring Stations/State and Local Air Monitoring Stations (NAMS/SLAMS) and numerical output from the Models-3/Community Multiscale Air Quality (CMAQ). Predictive surfaces are provided over the entire CMAQ 12 km and 36 km spatial domains for each year. These spatial domains vary by year, please refer to Section D below for actual domain coordinates.</p>
* PURPOSE	<p>The predictive surfaces are intended for use by statisticians and environmental scientists interested in the spatial distribution of pollution over daily time periods over 2001-2006. The predictive surfaces archived here are part of a research program in developing statistical fusion models at the US EPA/ORD. These surfaces could be used in modeling public health – air quality relationships, modeling ecosystem reactions to atmospheric inputs, and determining geographic areas with high pollution levels. As new space-time statistical models are developed, we will evaluate their use for providing improved predictions of air and deposition variables. Data inputs and modeling assumptions can change over time as we improve our modeling approach for fitting fused predictive air quality surfaces.</p>
SUPPLEMENTAL INFORMATION	
* PROGRESS	Complete
* UPDATE FREQ.	As needed

C. TIME & DATE PAGE

FIELD	FIELD CONTENT
* CURRENTNESS	February 9, 2010
* DATE TYPE	Range
* SINGLE DATE	
* MULTIPLE DATES	
Date 1	
Date 2	
Date 3	
* RANGE OF DATES	FROM: January 1, 2001 TO: December 31, 2006

D. GEOGRAPHIC AREA PAGE

2001 12 km FIELD	FIELD CONTENT (longitude, latitude)
* SOUTHWEST Corner	-99.5, 28.4
* NORTHEAST Corner	-67.0, 45.3
* NORTHWEST Corner	-100.4, 48.7
* SOUTHEAST Corner	-74.2, 25.9

2002-06 12 km FIELD	FIELD CONTENT (longitude, latitude)
* SOUTHWEST Corner	-106.8, 25.0
* NORTHEAST Corner	-65.3, 47.6
* NORTHWEST Corner	-111.1, 50.6
* SOUTHEAST Corner	-74.6, 22.9

2001-06 36 km FIELD	FIELD CONTENT (longitude, latitude)
* SOUTHWEST Corner	-119.4, 23.2
* NORTHEAST Corner	-63.7, 49.6
* NORTHWEST Corner	-129.9, 49.7
* SOUTHEAST Corner	-74.2, 23.2

E. KEYWORDS PAGE

FIELD	FIELD CONTENT
* THEME	ISO

* THEME KEYWORDS	Environment
THEME 2	EPA
THEME 2 KEYWORDS	Air
THEME 3	
THEME 3 KEYWORDS	
* PLACES	Eastern United States for 12 km CMAQ domain, contiguous for 36 km CMAQ domain
* PLACES KEYWORDS	
PLACES 2	
PLACES 2 KEYWORDS	
PLACES 3	
PLACES 3 KEYWORDS	

F. SECURITY PAGE

FIELD	FIELD CONTENT
* SECURITY CLASSIFICATION SYSTEM	EPA classification system
* CLASSIFICATION	Medium Confidentiality
* SECURITY HANDLING DESCRIPTION	May be shared with within the research community
* ACCESS CONSTRAINTS	Access for specific applications within use constraints
* USE CONSTRAINTS	The data are intended for use by statisticians interested in the spatial distribution of daily air pollution over multiple years. Collaboration with EPA in these studies is expected.

II. DATA QUALITY TAB

FIELD	FIELD CONTENT
* PROCESS DATE	September, 2009, All PM _{2.5} surfaces updated to include the first and last day of the year using all collocated monitoring data.
* PROCESS DESCRIPTION	The best available statistical model and air quality data/numerical model output are used to develop these surfaces. It should be noted that data inputs and modeling assumptions can change over time as we improve our modeling approach for fitting fused predictive surfaces.
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* LOGICAL CONSISTENCY REPORT	The predictive surfaces are based on using two sources of spatial information: air monitoring data and CMAQ numerical output for 2001-06. The CMAQ output is produced at EPA (http://www.epa.gov/asmdnerl/CMAQ).
* COMPLETENESS REPORT	Predictive surfaces are provided for all days of the year.

III. ENTITY AND ATTRIBUTES TAB

FIELD	FIELD CONTENT
* OVERVIEW	The predictive surfaces are intended for use by statisticians in modeling efforts that require high resolution air quality inputs for the period, 2001-06.
* DETAILED CITATION	<p>Input data The NAMS/SLAMS air quality monitoring data were downloaded from the Air Quality System (AQS) database. The CMAQ numerical output were created from version 4.6 of the model using CBIV mechanism. The output are 24-hour integrated PM_{2.5} and daily 8-hr maximum O₃ areal average concentrations over 12 km and 36 km CMAQ grids. These CMAQ results are based on: (1) emissions data from the EPA's National Emissions Inventory developed using mobile emissions model Mobile 6; and (2) daily continuous emissions monitoring data for the major NO_x point sources. Further, the meteorological data used for these model results is from Mesoscale Model 5 (MM5) version 3.6.3 simulations (FDDA, Pleim-Xu lsm).</p> <p>The space-time Bayesian fusion model combines the monitoring data and CMAQ output to predict PM_{2.5} through space and time. The model assumes that both the actual monitoring data and the CMAQ data provide good information about the same underlying pollutant surface, but with different measurement error structures. It gives more weight to the accurate monitoring data in areas where monitoring data exists and relies on the CMAQ data and satellite data in areas where no</p>

	monitoring data is available. The modeling is divided into hierarchical components where each level of the hierarchy is modeled conditional on the preceding levels. To fit the model, a custom-designed Monte Carlo Markov Chain (MCMC) software was used.
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IV. DISTRIBUTION TAB

FIELD	FIELD CONTENT
RESOURCE DESCRIPTION	Downloadable Data Files (.csv) containing Predictive Surfaces
DISCLAIMER/LIABILITY	Although these data have been processed successfully on a computer system at the Environmental Protection Agency, no warranty expressed or implied is made regarding the accuracy or utility of the data on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. It is also strongly recommended that careful attention be paid to the contents of the metadata file associated with these data to evaluate data set limitations, restrictions or intended use. The U.S. Environmental Protection Agency shall not be held liable for improper or incorrect use of the data described and/or contained herein.
CUSTOM ORDER PROCESS	

V. METADATA TAB

FIELD	FIELD CONTENT
* DATE CREATED	February 9, 2010
* STANDARD NAME	
* ACCESS CONSTRAINTS	Access for specific applications within use constraints
* USE CONSTRAINTS	The data are intended for use by statisticians in modeling efforts that require high resolution predictive spatial fields of air pollution.

VI. CONTACTS TAB

A. ORIGINATORS PAGE

FIELD	FIELD CONTENT
* PERSON	David Holland
* ORGANIZATION	US Environmental Protection Agency
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B. DISTRIBUTORS PAGE

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